Environmental Resources

Ensuring a quality natural environment for future generations is a commitment of this Plan. This section outlines the central themes comprising the community's environmental inheritance and describes basic character of the regions's natural resource base.

Environmental Resource Themes

Four major themes embody the underlying character of the area's natural environment. Each applies to how long term comprehensive planning is conducted and implemented in the city and county. These environmental resource themes are briefly summarized below.

The County's Natural Features can Help Guide the Future Use of Land

Lancaster County's natural features can serve as an aid in planning tomorrow's land uses. Urban, rural, and agricultural land forms each have their own distinctive character. Matching these activities with the most suitable areas of the County can ensure the environmental stewardship offered by the Comprehensive Plan's Vision.

The County is Shaped by Several Major Watersheds

Watersheds are the natural land boundaries dividing drainage basins in the county. Four major watersheds shape Lancaster County – Salt, Middle Big Blue, Big Nemaha, and Little Nemaha. Natural and human activities use and need to respect these watersheds. Managing natural and human resources at the basin level allows consideration of the varying influences exerted on these areas from agriculture to urbanization.

The County is Home to Unique and Highly Sensitive Biological Communities

Lancaster County's environmental legacy includes a number of unique and highly sensitive biological communities within a prairie ecosystem — including saline wetlands, native grasslands, the Salt Creek Tiger Beetle, and Wilderness Park. The county's saline wetlands in particular are considered by many as one of the rarest and threatened natural communities in the region. Tallgrass prairies are another of the area's highly sensitive natural communities. They provide habitat for endangered species and represent a link to the region's prairie heritage.

The County's Natural Resources Form a Complex and Sensitive System

While natural resources can be studied individually, all such resources are part of larger, interconnected networks. Linkages are often hard to distinguish or understand. Natural resources policy making needs to consider the entire system so that all its components can be understood and addressed.

Topography

Flat and rolling plains of moderate relief best characterize the region's terrain. From its highest elevation of 1,520 feet to its lowest of 1,080 feet, the County slopes gradually eastward, with the lowest point located on Salt Creek where it exits the eastern portion of the county. The 440 feet of elevation difference is about equal to the height of the Nebraska State Capitol (including the Sower).

Climate

Lancaster County's climatic conditions range from very cold in the winter to very hot in the summer. The average winter temperature is 27 degrees Fahrenheit. The average summer temperature is 76 degrees Fahrenheit. About 30 inches of precipitation fall annually on the county. The average growing season is 160 to 175 days (frost-free).

Soils

Lancaster County soils are quite variable – ranging from very deep to very shallow, clayey to loamy, nearly level to steep, and have different chemical and physical properties. The most extensive soils are the Sharpsburg, Wymore, Pawnee, Judson, and Kennebec soil series.

The soils are generally "moderately well" to "well drained," with permeability and infiltration rates varying across the county. For the most part, soils north of Lincoln permit faster infiltration rates while soils to the south of the city have slower infiltration rates and thus have higher runoff potential.

Hydric (capable of holding more water) and saline soils are more prevalent in the north portion of the county and give rise to numerous freshwater and saline wetlands. The high salinity and lower quantity of water in the north also influences the availability of ground water for domestic use.

Soil provides a major resource base for crops, forage and other vegetation in Lancaster County. Proper soil treatment retains vegetative productivity, limits runoff of sediment and chemicals to the surface water, and helps lessen flooding. The most important part of the soil resource is the topsoil; the layer of earth enriched by organic material built up in the top inches.

The characteristics of soils found throughout Lancaster County include a number of conditions impacting land management and uses. These characteristics include soil conditions known for the following:

- *Soil permeability and infiltration - how easily and fast moisture gets into the soil*
- *Hydric soils - how wet the soil stays*
- *Saline soils - how much salt the soil contains*
- *Frost-action - how the soil acts in cold conditions*
- *Shrink-swell - how the soil expands and contracts during changes in the seasons*
- *Erosion - how easily the soil is worn away by water and wind*

WATERSHEDS

Lancaster County is carved into numerous natural watershed basins, crossing parts of four major watersheds - also known as drainage basins.

The largest watershed - encompassing most of Lancaster County - is the Salt Watershed, which produces Salt Creek. The Salt Watershed is 1,627 square miles in total area, only a portion of which is located in Lancaster County. Other watersheds in the county include the Middle Big Blue (southwest), the Big Nemaha (southeast) and Little Nemaha (east). Within each of these watersheds exists smaller sub-watersheds or sub-basins. Watersheds drain surface water naturally into lakes, wetlands and streams by way of floodplains, and also form the basis for the City of Lincoln's wastewater collection system.

Major Watersheds in Lancaster County

GROUNDWATER

Lancaster County's geology and groundwater hydrology are very complex. Groundwater quantity, quality, and the ability of the principal aquifer to yield water vary markedly within the county.

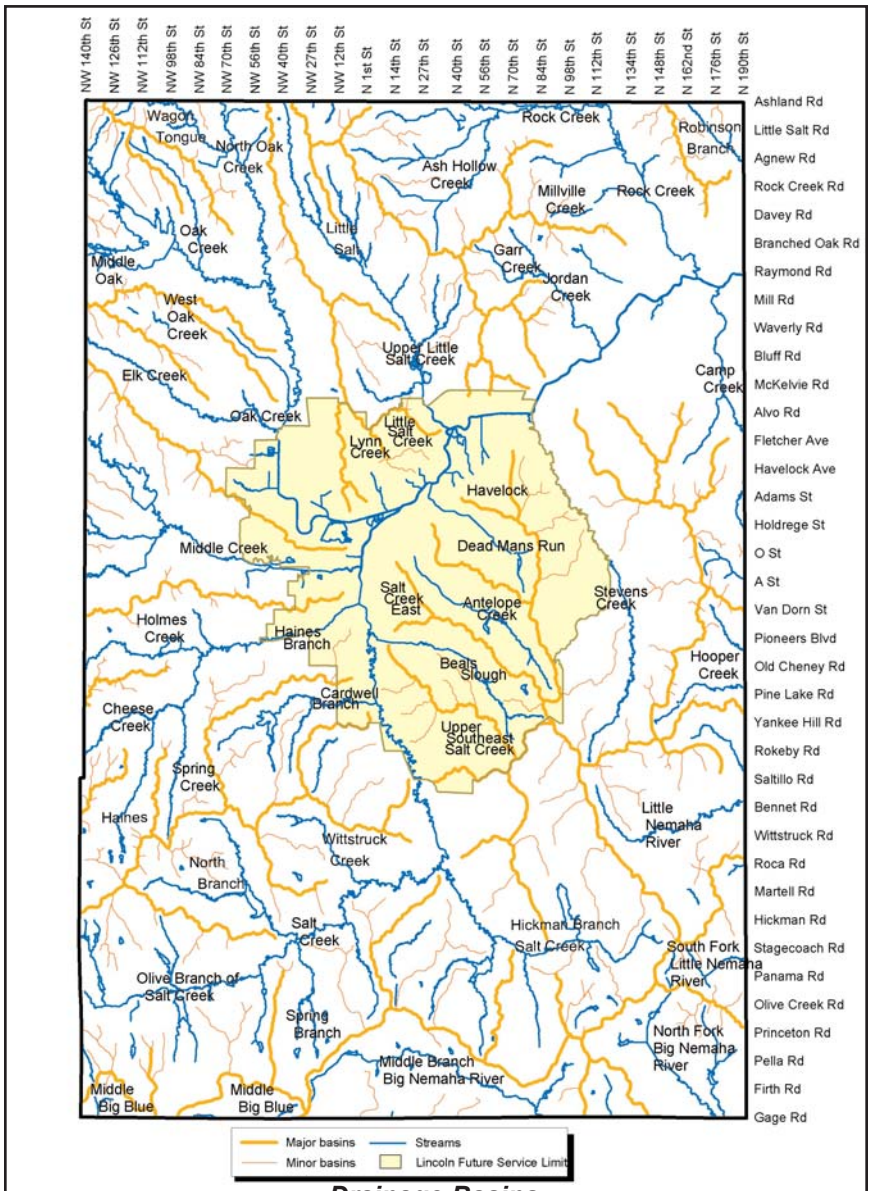
Groundwater is water that seeps into the ground and collects in cracks and spaces in soil, sand and rocks. Groundwater is stored in, and moves slowly through, layers of soil, sand and rocks that are underground called aquifers. Substantial variations can occur between near-by sites.

Groundwater is used for farming irrigation and is the primary source of drinking water for many residents in rural Lancaster County. The Dakota aquifer is a common source of water for many wells in Lancaster County. Well yields and water quality from wells in the Dakota are highly variable. Groundwater found within the county's boundaries supplies about a quarter of total water use.

A high saline content in the soils in the north and northwest portion of Lancaster County causes a salt-water intrusion hazard. Saline groundwater is often found north and west of Lincoln.

Lincoln Water System has addressed the limitations of local water supplies by importing all but a very small percentage of its water from outside the county. The Ashland wellfield, outside the county's boundaries about 30 miles to the northeast of the city on the Platte River, provides about three quarters of the county's total water usage.

Small areas of groundwater contamination from a variety of point sources of pollution are scattered across the county, mostly in or near urban areas. These localized sources of contamination can be from leaking underground storage tanks, grain handling facilities, "brownfields" or abandoned industrial sites, manufacturing facilities, fertilizer and pesticide storage, a variety of other types of spills, or past waste handling procedures among other causes.



Drainage Basins

FLOODPLAINS

Watersheds naturally drain surface water — that is, rain, snow melt, and human-produced runoff from such activities as lawn and farm irrigation – into streams, lakes, and wetlands by way of floodplains. For regulatory purposes, the floodplain is often divided into the floodway, composed of the stream channel and adjacent overbank area, and the floodfringe, or outer portion of the floodplain.

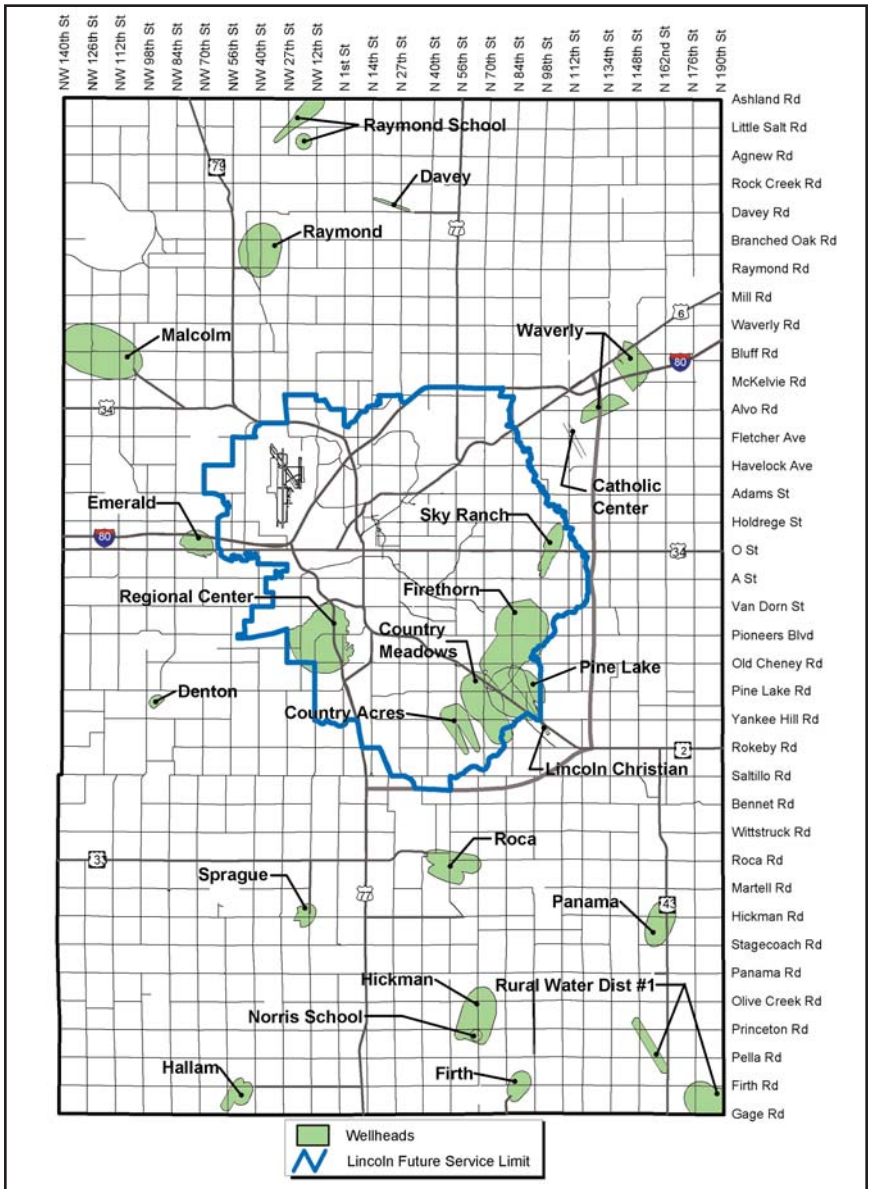
Floodplains comprise over 10 percent of land area in Lancaster County and are home to almost all of the county's high value saline wetlands. Floodplains and wetlands — both freshwater and saline — filter sediments, reduce flood velocities and provide storage areas for water during storm events.

A discussion of stormwater and watershed management considerations is provided later in the Plan.

Surface Water

The county's surface water resources are primarily contained in the area's many streams and lakes. There are about 400 miles of warm water streams in Lancaster County. These water features contribute to numerous ponds and lakes, including 16 major lakes ranging in size from 20 acres to 1,800 acres. The county's 10 largest lakes were constructed by the United States Army Corps of Engineers during the 1960's for flood control and recreation.

Surface water is susceptible to pollution in the form of sedimentation and contamination from runoff. Fertilizers and sediment are the most common water quality problems in the County's streams and lakes. Agriculture, construction, and urban runoff are the primary sources of point (linked to a specific site) and non-point (generalized and thus not able to be linked to a specific location) pollution.



Wellhead Protection Zones

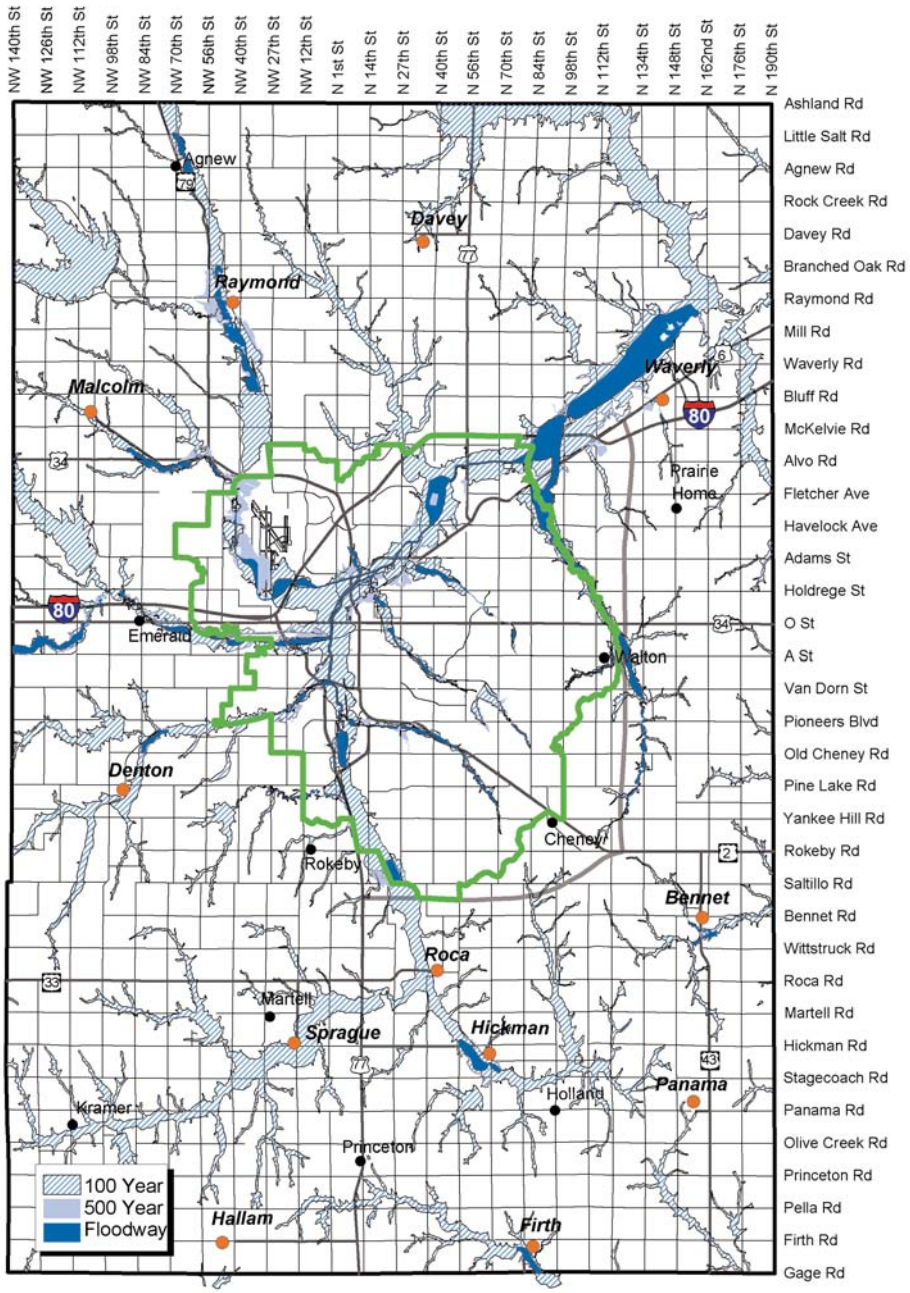
Habitat

Vegetation provides important habitat for a variety of species in Lancaster County.

Historically, the county was covered in native tallgrass prairies. Dominant grasses included big and little bluestem, indian grass, sideoats grama, and porcupine grass. Whereas the county was once almost entirely covered by native grasses, it is now dominated by cropland, urban vegetation and other human associated uses. Today, approximately 8,640 acres (or about 1.5 percent of the total land area in the county) remain as prairie grasslands. A number of species use native prairies as habitat for all or part of their life cycles.

Native prairies are a unique part of Lancaster County's natural heritage and represent a historical snapshot of the county as it existed prior to European settlement. Native prairies provide recreational and educational opportunities to the citizens of Lancaster County, as well as habitat for wildlife and plant species, including rare, threatened, and endangered species, such as the Western Prairie Fringed Orchid. Of the 301 species of birds found in Lancaster County, about one in three nest in native grassland habitats.

Most – but not all – of the remaining native grasslands are located in the west-central portion of the county, with several high quality remnants in the northwest quadrant as well. Nine Mile Prairie and Spring Creek Prairie are two of the county's largest and most valued grassland tracts.



County Floodplains

Long term survival of many natural vegetative areas such as prairies requires periodic burning. Fire helps to redistribute nutrients to plant species, as well as to control woody plant invasion and the spread of non-native plants. Unfortunately burning causes smoke that can disturb adjacent human residents. Smoke buffers of one-quarter to one-half mile can help to diminish the conflicts during prescribed burnings.

The County's countless riparian corridors also represent a significant habitat resource. Riparian areas are the spaces immediately adjacent to water courses on each side of the stream. They are most often located in the floodplain.

There is frequently a significant amount of woody vegetation within their limits.
Riparian areas can serve as verdant connectors between neighborhoods, provide boundaries and edges between land uses, and afford opportunities for habitat and recreation activities.

Wetlands (Freshwater and Saline)

Wetlands — most notably saline or salt wetlands — played a significant role in the County's founding. In the earliest days of human settlement, the salt provided by the saline wetlands was the primary source for the preservation of meats.

Wetlands are found when three factors are present:

1. *Soil is routinely moist or wet*
2. *Hydric soils (soil that easily retains water) are evident*
3. *Water-tolerant vegetation (plants that live well in damp soils) is found there*

Saline wetlands occur when all three of these factors are present, along with saline conditions - there is salt there. Saline conditions usually arise because of salty groundwater, springs, or mineral deposits.

Today wetlands still perform many valuable functions, including improving water quality, supplying water for recharge, providing habitat for wildlife and vegetation, providing flood control, soil erosion control, and providing recreational and educational opportunities. Nine of Nebraska's 12 Federal Endangered and Threatened Species live in wetland areas.

Freshwater wetlands are scattered across Lancaster County and southern Saunders County with the largest concentrations located around reservoirs and streambeds. Saline wetlands tend to be located in the floodplain depressions of Salt, Little Salt and Rock Creeks. "Eastern Nebraska Saline Wetlands" are notably rare and are found in Lancaster and Saunders County, Nebraska. These saline wetlands form the habitat for the Salt Creek Tiger Beetle and the Saltwort (a.k.a., Western Glasswort), which are both on the State list of endangered species.

The importance of preserving wetlands for future generations has been recognized nationally through the Federal Clean Water Act. Under Section 404 of this Act, the United States Army Corps of Engineers and Environmental Protection Agency provide regulatory oversight of wetlands. Permits are required for the lawful alteration of wetlands. Even with this Federal surveillance in place, wetland management remains a significant land use consideration for local jurisdictions.

Wildlife

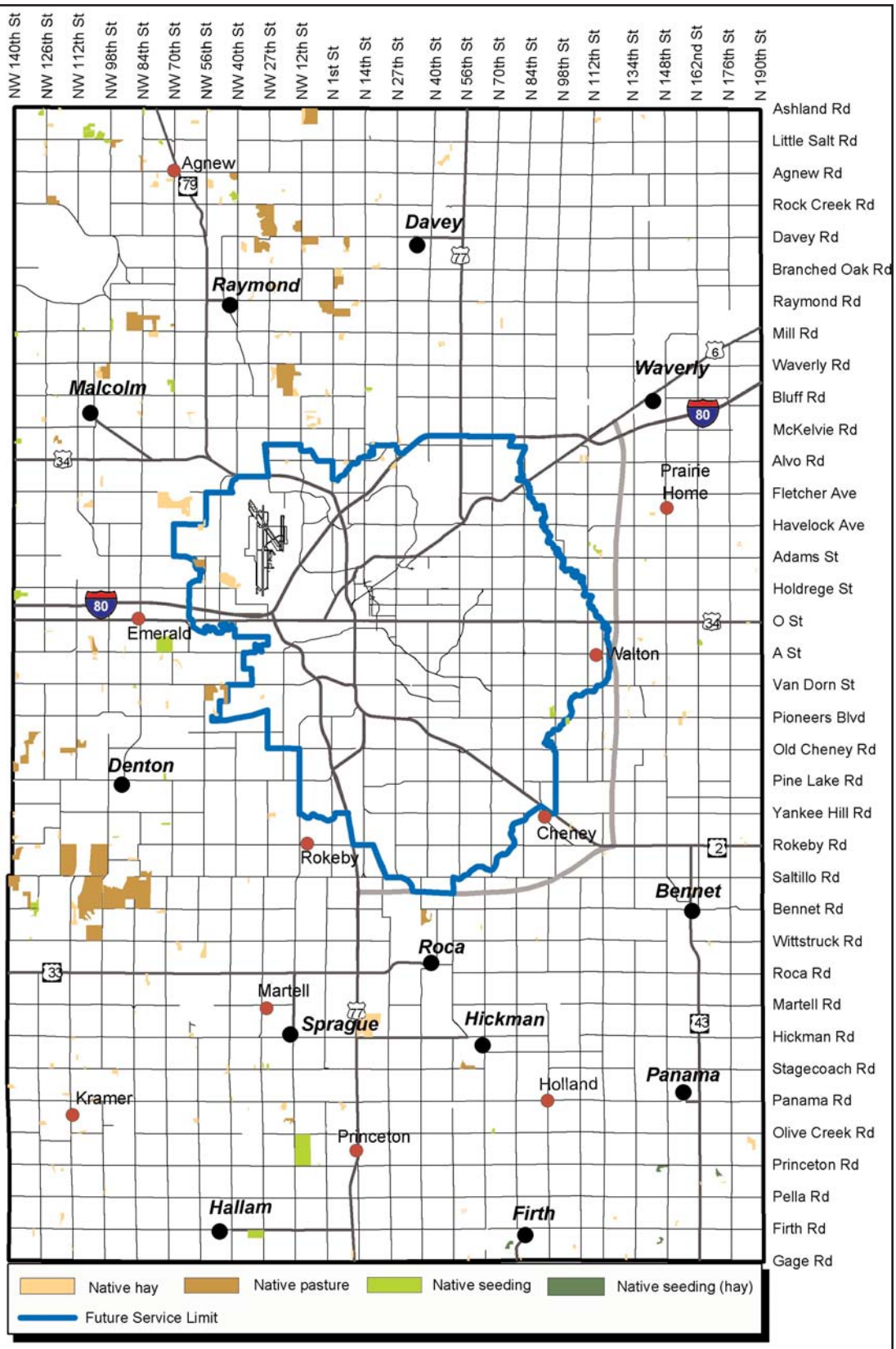
Threatened & Endangered Species Listed for Lancaster County:

Salt Creek Tiger Beetle (State Endangered)
Massasauga Rattle Snake (State Threatened)
Least Bittern (State Threatened)

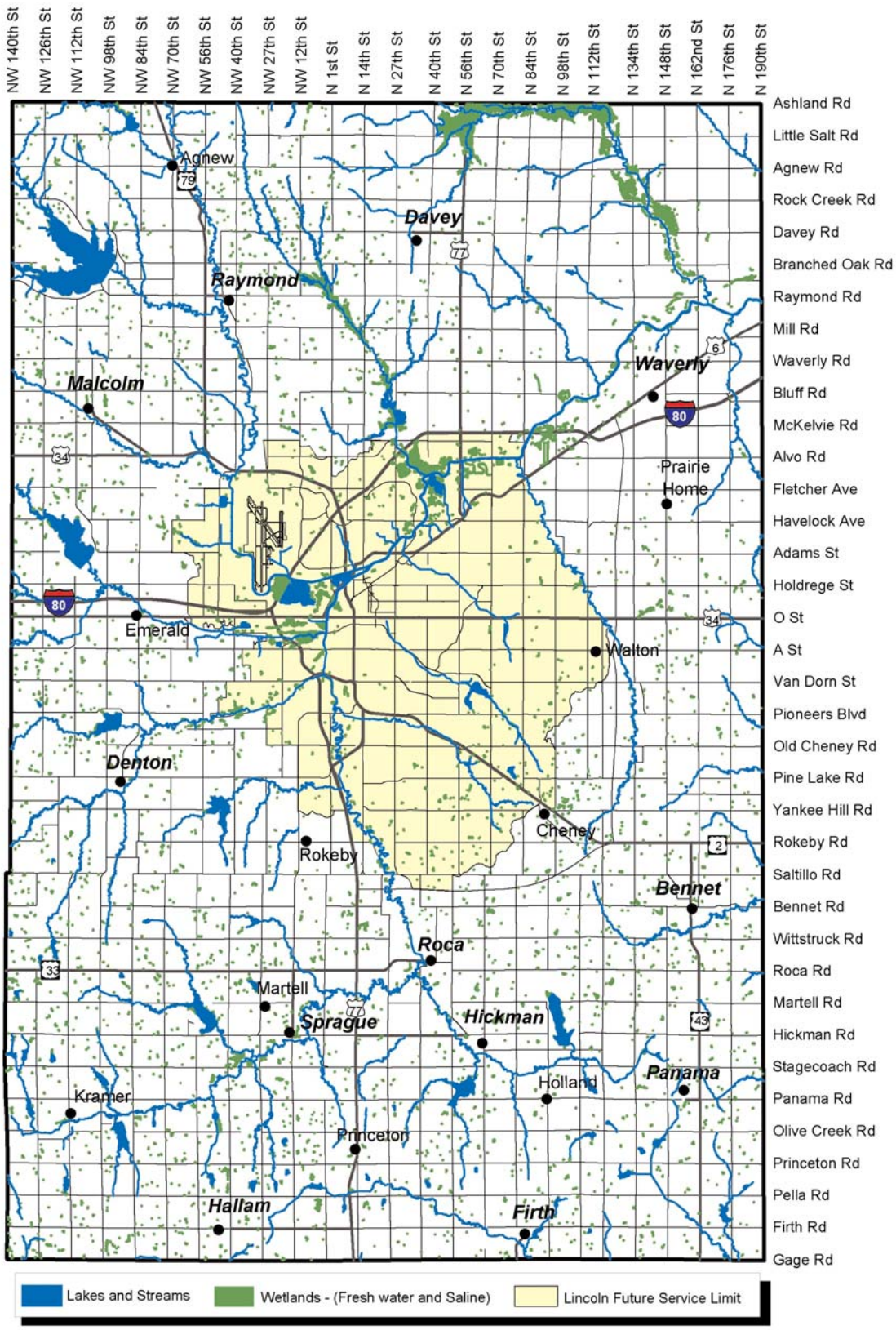
Species with Habitat or Historic Presence in Lancaster County:

Bald Eagle (State and Federal Threatened)
River Otter (State Threatened)
Topeka Shiner (State and Federal Endangered)
American Burying Beetle (State and Federal Endangered)

The composition and distribution of wildlife today is greatly different than it was prior to European settlement. Today, white-tailed deer are the most abundant large grazing mammal (excluding cattle). Agricultural practices and tree planting were among the widespread changes that have permitted expansion of occupied range for many species of songbirds and small mammals. More recently, construction of the Salt Valley flood control reservoirs have had profound effects, including concentrations of migrating ducks and geese, along with permanent deep water which now supports a variety of fish species.



Native Grasslands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Raymond Rd
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Stagecoach Rd
Panama Rd
Olive Creek Rd
Princeton Rd
Pella Rd
Firth Rd
Gage Rd
Agnew
Davey
Raymond
Malcolm
Waverly
Prairie Home
Emerald
Walton
Denton
Cheney
Rokeby
Bennet
Roca
Martell
Sprague
Hickman
Holland
Panama
Kramer
Princeton
Hallam
Firth
Lakes and Streams
Wetlands - (Fresh water and Saline)
Lincoln Future Service Limit

Wetlands

Native prairies, wetlands, and riparian corridors provide important habitat for much of the County's remaining wildlife. Rare, threatened and endangered species, or their habitat are also found throughout Lancaster County.

AIR QUALITY

Lincoln-Lancaster County enjoys relatively clean air. The level of air pollution, as measured against health-protective ambient standards set by the United States Environmental Protection Agency, is low. The quality of outdoor air has a direct effect on the health of the public. Standards are in place to protect public health from serious adverse effects of particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, ozone, and lead.